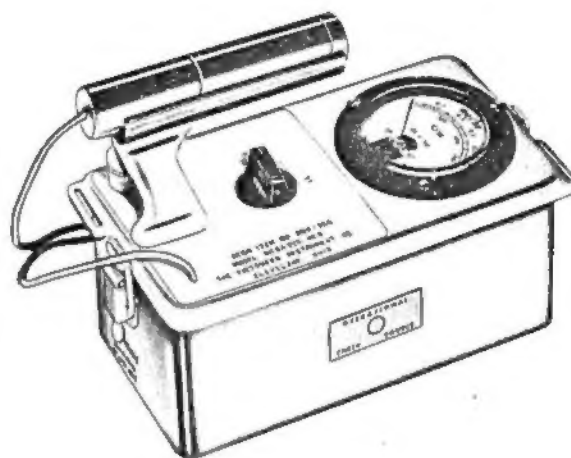


# section 3

CDV-700-6&6A



## specifications:

- Ranges: 0-0.5, 0-5, 0-50 mr/hr
- Sensing Element: Geiger Tube
- Accuracy:  $\pm 15\%$  of true dose rate from cobalt 60 or cesium 137 gamma radiation
- Batteries: Four 1-1/2 volt NEDA 13
- Dimensions: approx. 8-3/4" long x 4-1/2" wide x 6-3/4" high including handle
- Weight: approx. 4 lbs. including batteries



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## GENERAL DESCRIPTION

### Introduction

The Victoreen CD V-700 models 6 and 6A are portable geiger counter instruments designed for the detection of low levels of beta and gamma radiation. The two instruments may be considered identical for the purposes of repair and maintenance.

The geiger tube is mounted in a probe on the end of a thirty-six inch cable. The entire instrument and its accessories include a circuit box, a probe, a headphone, an indicating meter, and a carrying strap. A radioactive sample is mounted on the side of the case for checking the operation of the instrument.

### Sensing Indicators and Control

A meter with a scale reading in milliroentgens per hour (mR/hr) is used for visual indication, and a headphone is used for aural monitoring. The meter is ruggedized and sealed in a plastic case to meet the instrument requirements for water-tightness, shock and vibration resistance.

The meter is controlled by the range selector switch labeled "OFF, X100, X10, and X1". The range switch changes only the meter ranges. It does not affect the number of "clicks" in the headphone.

VictoreenReadings

Table 3-1 lists switch positions and the corresponding meter readings. Figure 3-1 shows the meter face. Readings should not be taken with the pointer indicating in the lower 10% of the scale. Turn to the next most sensitive range until the pointer indicates in the upper 90% of the scale.

| Switch Position | Counts/Minute | mR/hr |
|-----------------|---------------|-------|
| X1              | 0-300         | 0-0.5 |
| X10             | 0-3000        | 0-5.0 |
| X100            | 0-30,000      | 0-50  |

Table 3-1. Switch Positions vs Meter Readings

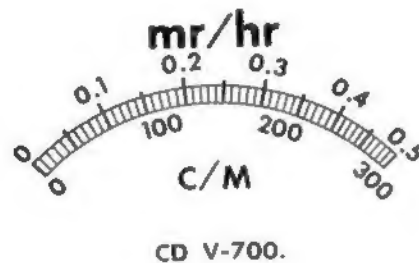


Figure 3-1. Meter Face

Initial Check

With the batteries installed, turn the range switch to the X10 position. Close the beta window of the probe. After thirty seconds the circuit should be stabilized and the meter should read zero in the absence of radiation.

Open the beta window on the probe and place the open window on the center of the OPERATIONAL CHECK SOURCE on the side of the instrument. The meter reading should average between 1.5 and 2.5 mR/hr.

Background Count

Normal background radioactivity is about 0.01 to 0.02 mR/hr or about 20

counts per minute. Counts are randomly spaced and several seconds may elapse before any activity registers on either the meter or the headphone. Accurate measurements of background and other low level radiation can be made by counting the headphone "clicks" against a watch that has a second hand. Note the number of counts occurring in a time period of 5 minutes. Divide the number of counts by 5 and the background count is expressed in terms of counts per minute. More accurate measurements may be made by extending the time period.

### Batteries

The CD V-700-6 and 6A are powered by four 1-1/2 volt "D" size flash-light batteries. The batteries will operate the instruments continuously for over 100 hours and intermittently for over 175 hours. Refer to Appendix A for acceptable types and makes of batteries.

Installation (See figure 3-2)

Open the instrument by lifting the pull catch at each end of the case and separating the two halves to expose the battery compartments and the battery

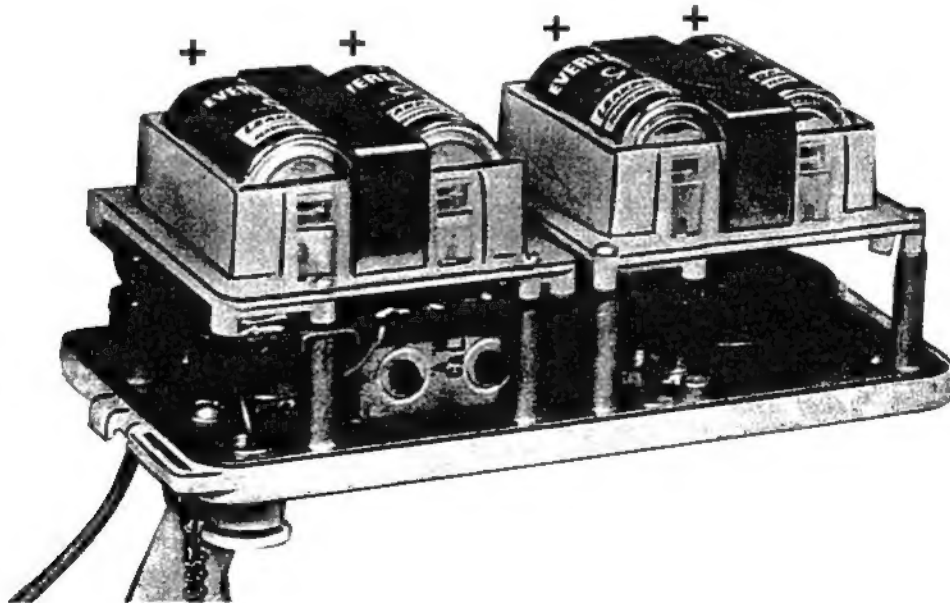


Figure 3-2. Battery Installation

retaining clips. Remove the clips by squeezing the ends and lifting. Insert fresh batteries according to the polarity marked on the inside of the battery compartments. The battery compartments will not accept batteries with the polarity reversed. Install the battery clips and close the case by aligning the two halves and closing the pull catches.

#### Replacement

If the instrument fails to operate, check the batteries before attempting to make any repairs or adjustments. A battery tester may be used or the batteries may be checked under load with a voltmeter while installed in the instrument. With the range switch in the X100 position, the batteries in the front battery compartment should measure at least 1 volt each. In the rear compartment, each battery should measure at least 1.25 volts. It is recommended that all the batteries be replaced at one time to avoid exceeding the shelf life of any one cell.

#### Electronic Circuitry

All electrical components which make up the circuitry are fastened to a printed circuit board. The circuitry serves to count the geiger tube pulses and to indicate their frequency in terms of dose rate on a calibrated scale.

#### High Voltage Power Supply

The high voltage supply needed by the geiger tube is a blocking oscillator driven "fly-back" circuit. The blocking oscillator portion of the circuit consists of Q2, R7B, transformer windings 3-4 and 5-6, and batteries BT1 and BT2. When the instrument is turned on, Q2 conducts and an increasing current flows through transformer winding 3-4. The increasing collector current induces a voltage in transformer winding 5-6 which maintains conduction of Q2. The collector current increases until Q2 has sufficient current gain to remain saturated when the circuit rapidly turns off due to the regenerative action of the transformer. During the "turn-off" action, large "fly-back" voltages appear across all transformer windings. A peak voltage of about 1100 volts appears across winding 1-2 because of the large number of turns of wire in the winding. This voltage "fly-back" is rectified by CR5 in a conventional



manner. R12 and C4 filter and smooth the pulsations of voltage across C5. V2 is a corona-discharge regulator tube which maintains the voltage at the proper level for operation of the geiger tube.

#### Pulse Shaping Circuit

The pulse shaping circuit is a blocking oscillator similar to the power supply, but with some exceptions. The circuit is held "cut-off" by the bias formed by resistors R9 and R10 and the power supply batteries. The blocking oscillator consists of Q1, T1, L1, C1, and CR1. C1 couples negative pulses from the geiger tube to the base circuit of Q1. Inductance L1 forms a high impedance for the geiger tube pulses while it is a low resistance to direct current. CR1 prevents oscillations from occurring across L1. When Q1 is turned on by a pulse from the geiger tube, Q1 saturates and nearly all of the battery voltage of BT3 and BT4 appears across the transformer winding 3-4. As the current increases in winding 3-4, a voltage is induced in winding 1-2. The induced voltage is in such a direction that conduction of Q1 is maintained. The current in transformer winding 3-4 increases linearly until the transformer core saturates. At this time the circuit rapidly turns off, and an inductive "fly-back" voltage appears across both windings.

#### Metering Circuit

The "fly-back" pulse induced in transformer winding 3-4 is rectified by diode CR2. The range multiplier resistors R1, R2, R3, and R4 determine the amount of charge that is placed on integrating capacitor C2 during the pulse period of the blocking oscillator. The capacitor is discharged by the meter and resistor R5. Resistors R6 and R7A are used for calibration.

#### Audio Circuit

The pulse for the headphone is taken from the "fly-back" of transformer winding 3-4 through diode CR3. C3 is an integrating capacitor used to stretch the pulse. R8 provides isolation and CR4 damps ringing in the headphone.



## SERVICING

### Precautions

#### High Voltage Power Supply

The high voltage supply of the instrument operates in excess of 900 volts. The shock is uncomfortable rather than dangerous but should be avoided. The high voltage components should not be touched even when the instrument is turned off until the high voltage capacitors have been discharged. These capacitors are to be discharged by shorting the voltage regulator tube. Do not short the geiger tube leads since this causes component failure in some models.

#### Geiger Tube

Care must be exercised not to dent the geiger tube. Dents in the tube may cause arcing at voltages lower than the operating voltages and the tube will be useless. Dropping the tube may cause leakage of the gas mixture.

#### Semi-Conductor Components (Diodes and Transistors)

The diodes and transistors used in the instrument may be damaged by prolonged heating during soldering. When replacing any of these components, the soldering operation should be done quickly. Hold the lead between the com-

ponent and the joint with a heat sink to decrease the amount of heat transmitted to the component. Techniques are described in section I of this Manual. The leads of the high voltage rectifier may break if subjected to strain when removing the component from the circuit board. Use a soldering aid to lift the leads.

### Disassembly Instructions

1. Open the pull catches at the ends of the case and remove the instrument from the case bottom.
2. Remove the batteries.
3. Remove the eight screws from the battery compartments. Note that the two screws at the rear of the circuit board are slightly longer than the others.
4. Remove the range switch knob from the front panel by loosening both set screws.
5. Disconnect the meter by removing the two nuts holding the connecting lugs.
6. Remove the circuit board from the case top by pressing on the range switch shaft. Remove the board slowly since the geiger tube lead and the headphone jack lead are still connected.
7. Reassembly is the reverse of the above process. On some models, the geiger probe shield is connected to the circuit board through a solder lug between the board and the nearest case top leg. This lug must be replaced during reassembly.

### Preventive Maintenance

It is recommended that preventive maintenance be carried out once a month when the instrument is in use and once every six months when the instrument is in storage.

1. Remove the batteries, clean the battery contacts and battery terminals if necessary, and remove any corrosion present.
2. Replace the batteries making certain that all batteries exceed the minimum voltages.

3. Perform the Initial Check as described on page 3-2.
4. If the instrument is to be shipped or stored, remove the batteries and set the range switch to one of the sensing ranges. This will shunt the meter and minimize damage from movement of the pointer during shipment or storage.

Do not use solvents on plastic parts. Clean with soap and water. If the battery has leaked, remove the case bottom and wash it with warm soapy water. The battery spillage will be loosened in a short while and can be rinsed out.

### Repairs

#### Adjusting the High Voltage Power Supply

The special high voltage adjustment on the CD V-700 models 6 and 6A permits greater instrument life by compensating for component aging. Whenever fresh batteries are installed in the instrument and the instrument still fails to operate, check the high voltage adjustment. The voltage at test point F should be checked with a high impedance voltmeter. (See Appendix B for procedure.) If the voltage is too low, adjust the high voltage oscillator as follows:

1. Connect a VOM or a 100 ma panel meter in series with the power supply batteries in the front battery box.
2. Turn the high voltage adjustment, R7A, fully clockwise.
3. Turn the range selector switch to X100.
4. Rotate the screwdriver adjustment counterclockwise until the meter reads 33 milliamperes, or until the high voltage output, as measured at point F, is correct.

#### Replacing the Geiger Tube

1. Grasp the two ends of the probe and twist in a counterclockwise direction to unscrew the tube housing from the socket housing.
2. Insert the new geiger tube into the socket pressing the tube into the socket and against the rubber gasket. Do not handle the thin beta window.

3. Place the tube housing over the geiger tube.
4. Engage the threads of the tube housing and socket housing with a steady pressure against the shock mounting spring and screw together in a clockwise direction. Overtightening may interfere with the operation of the beta shield.

### Replacing the Voltage Regulator Tube

The VR tube is held to the circuit board with a rubber grommet and metal clip. To remove the tube, unsolder the leads and press on the top of the tube to lift the leads. Twist the tube while pulling it out of the protective grommet. Coat the top half of the new tube with a lubricant such as silicone grease and slide it into the grommet. Connect the cathode to ground and the anode (red dot) to point F. (See figure 3-5) Position the tube so that the leads will not short to the instrument case. Figure 3-3 shows a properly installed voltage regulator tube.

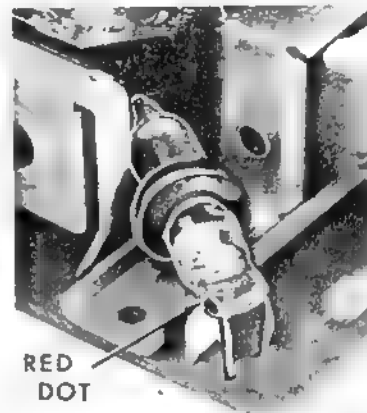


Figure 3-3. VR Tube Placement

### Replacing Coil L1

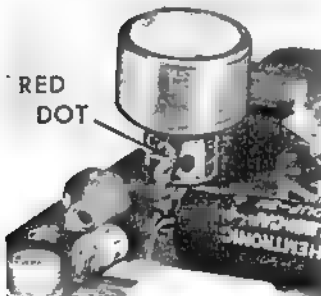


Figure 3-4  
L1 Placement

L1 must be installed with the correct polarity for proper operation of the pulse shaping circuit. The red marking should face R4 and Q1. If a shielding ferrule was present on the old coil and is not present on the new one, the ferrule should be transferred to the new coil. Wrap the coil with a layer of masking tape. Glue the ferrule to the top of the coil with radio service cement, model airplane cement, or epoxy cement. Be careful not to cut through the coil winding. Figure 3-4 shows the proper mounting of L1.

### Replacing Transformers

The transformers must be removed by drilling out the two eyelets holding them to the circuit board. To be sure that transformer replacement will cure the fault, unsolder the leads and substitute another transformer before removing the old one.

The laminations of the pulse transformer, T1, must be held together tightly for proper operation. Eyelets, bolts and nuts, or cotter pins may be used for mounting, but the laminations must be pressed tightly against the circuit board.

### Replacing the Geiger Probe

1. Remove the rear battery compartment and unsolder the probe leads.
2. Remove the seal nut with an adjustable wrench.
3. Untie the knot, remove the solder lug if present, and pull the cable through the hole in the case top.
4. Prepare the new cable according to the instructions in section 1 of this Manual.
5. Twist the center conductor and shield together to allow the wires to be inserted through the case top. Pull on the end of the cable with pliers until a sufficient amount extends through the case top.
6. Replace the seal nut and washers on the new cable and tighten the seal nut using moderate pressure. Excessive tightening can damage the cable. Tie a knot in the cable near the seal nut.
7. Connect the cable to the circuit board and replace the battery compartment. The ground lead is soldered to a lug under the nearest case top leg on some models. On newer units, a lug under the handle mounting screw is the ground connection.

### Replacing the Switch

1. Follow the Disassembly Instructions through step 6.
2. Heat each switch terminal on the circuit board, one at a time, and press sideways on the switch shaft. This will tend to lift the terminals from the circuit board. Repeat this procedure several times, pushing away from the solder joint each time, until the switch is free.

3. Open the holes on the circuit board with a soldering pencil and soldering aid to allow the switch terminals to be inserted.
4. Insert the new switch and solder each terminal using a minimum amount of heat. Be sure the switch is seated properly so that the shaft will fit through the hole in the case top.

### Trouble Shooting

The information in this section is presented as an aid to the service technician in determining the causes of specific instrument faults. The Trouble Shooting Guide lists the most probable causes of instrument failure together with suggestions for corrective action. This should be consulted and followed after the following preliminary steps have been taken:

1. Disassemble the instrument through step 3 of the Disassembly Instructions.
2. Check all batteries. Make sure they provide sufficient voltage for proper operation of the instrument.
3. Check the printed circuit board for broken foil, cold solder joints, or solder bridges.
4. Check for broken components.

Table 3-2, Test Point Chart, and figure 3-5, Location of Test Points, eliminate the need for circuit tracing when making voltage and resistance measurements. The Test Points are referred to in the NOTES column of the Trouble Shooting Guide, and are also found on the schematic circuit diagram.



# TROUBLE SHOOTING GUIDE

| SYMPTOM |           | PROBABLE CAUSE   | CORRECTIVE ACTION  | NOTES  |
|---------|-----------|--|--|--|
| Meter   | Headphone |  |  |  |
| Dead    | Dead      | Batteries low or making poor contact                                   | Check batteries and contacts                             | Voltage at F low   |
|         |           | High voltage power supply not properly adjusted                        | Adjust R7B   | Check starting voltage of tube. This must be lower than voltage at point F |
|         |           | Geiger tube defective or not compatible with instrument's high voltage | Replace geiger tube or correct instrument's high voltage | Voltage at F=0. CR1 may be damaged   |
|         |           | Probe shield shorting to high voltage supply                           | Dress leads  | CR1 may be damaged   |
|         |           | Geiger probe defective   | Repair or replace probe                                  | Check geiger probe and C1 for shorts before replacing CR1                  |
|         |           | CR1 shorted  | Replace CR1 ✓  | Voltage at F=0. Check Q2 for beta and shorts                               |
|         |           | Q2 defective   | Replace Q2 ✓   |  |

| SYMPTOM          |                  | PROBABLE CAUSE | CORRECTIVE ACTION    | NOTES  |
|------------------|------------------|----------------|----------------------|--|
| Meter            | Headphone        |                |                      |  |
| Dead<br>(cont'd) | Dead<br>(cont'd) | T2 defective   | Repair or replace T2 | Check resistance at<br>D - K<br>E - K<br>G - ▲   |
|                  |                  | Q1 defective ✓ | Replace Q1           |  |
|                  |                  | T1 defective   | Repair or replace T1 | Check resistance at<br>B - ▲<br>M - N  |
|                  |                  | CR2 shorted    | Replace CR2          |  |
|                  |                  | CR3 shorted    | Replace CR3          |  |
|                  |                  | CR5 defective  | Replace CR5          | Voltage at F low   |
|                  |                  | C1 open        | Replace C1           | Voltages normal. Check<br>by tapping with screw-<br>drive at probe pin 1<br>and at point N |
|                  |                  | C1 shorted ✓   | Replace C1           | Voltage at F low. CR1<br>may be damaged  |
|                  |                  | C4 shorted     | Replace C4           | Voltage at F=0   |
|                  |                  | C5 shorted     | Replace C5           | Voltage at F=0   |
|                  |                  | C5 open ✓      | Replace C5           | Voltage at F low   |

|         |                   |   |   |  |
|---------|-------------------|---|---|--|
| Dead    | Normal            | Meter defective<br>CR2 open<br>Open contact on S1A<br>C2 defective  | Repair or replace meter<br>Replace CR2<br>Repair switch<br>Replace C2                           | Check resistance at<br>A - ▲             |
| Normal  | Dead or<br>Weak   | Poor connection in<br>headphone plug or<br>jack<br>Headphone defective<br>CR3 open<br>CR4 shorted<br>C3 shorted | Repair connection<br>Repair or replace<br>headphone<br>Replace CR3<br>Replace CR4<br>Replace C3 |  |
| Upscale | Dead              | BT2 lead shorting to<br>lug on R7A<br>Q1 defective  | Dress leads<br>Replace Q1   | Voltage at H low.<br>Check Q1 for shorts |
| Upscale | Squeal or<br>Buzz | CR1 open<br>L1 open<br>CR4 open<br>CR3 defective  | Replace CR1<br>Repair or replace L1<br>Replace CR4<br>Replace CR3                               | Voltage at H high                        |

| SYMPTOM             |                            | PROBABLE CAUSE                                      | CORRECTIVE ACTION              | NOTES  |
|---------------------|----------------------------|---|--------------------------------|--|
| Meter               | Headphone                  |   |                                |  |
| Upscale<br>(cont'd) | Squeal or Buzz<br>(cont'd) | L1 needs shield                                     | Install no. 700-116 ferrule    | See figure 3-4   |
|                     |                            | L1 reversed   | Reposition L1                  | Red marking should face R4 and Q1. See figure 3-4                  |
|                     |                            | T2 defective  | Replace T2                     | Check voltage at F. Symptoms may cease when voltmeter is connected |
|                     |                            | C5 open   | Replace C5                     |  |
| Upscale             | Hiss or Click              | Probe shield shorting to high voltage supply        | Dress leads                    | Voltage at F low or intermittent. CR1 may be damaged               |
|                     |                            | Geiger probe defective                              | Repair or replace geiger probe | Voltage at F low or intermittent. CR1 may be damaged               |
|                     |                            | Geiger tube defective                               | Replace geiger tube            | Voltage at F high  |
|                     |                            | V2 defective or not making contact to circuit board | Replace or resolder V2         |  |
|                     |                            | T2 defective  | Repair or replace T2           | Voltage at F low or intermittent                                   |

| Erratic     | Normal | C2 open  | Replace C2   |                           |
|-------------|--------|--|--|---------------------------|
| High or Low | Normal | Meter defective  | Repair or replace meter                                  |                           |
|             |        | Calibration disturbed  | Recalibrate  |                           |
|             |        | Geiger tube defective or not compatible with instrument's high voltage | Replace geiger tube or correct instrument's high voltage |                           |
|             |        | Meter defective  | Replace meter  |                           |
|             |        | CR1 defective  | Replace CR1  |                           |
|             |        | CR2 defective  | Replace CR2  |                           |
|             |        | Q1 beta high or low  | Replace with transistor having proper gain               |                           |
|             |        | V2 defective   | Replace V2   | Check voltage at F        |
|             |        | CR5 defective  | Replace CR5  | Voltage at F low          |
|             |        | C2 defective   | Replace C2   |                           |
|             |        | C4 defective   | Replace C4   | Voltage at F low          |
|             |        | C5 defective   | Replace C5   | Voltage at F low          |
|             |        | Open contact on S1A  | Repair switch  | Check resistance at A - ▲ |

RESISTANCE CHART

Remove batteries before checking resistances. Values  $\pm 20\%$  except as noted.

| Component                     | Points | Range Switch Position | Resistance (ohms)                                 |
|-------------------------------|--------|-----------------------|---|
| S1A and calibration resistors | A - ▲  | X100<br>X100<br>X1    | 1900 $\pm 5\%$<br>200 $\pm 5\%$<br>16.5 $\pm 5\%$ |
| S1B                           | C - L  | All except OFF        | 0   |
| S1C                           | J - ▲  | All except OFF        | 0   |
| T1                            | M - N  | Any                   | 2   |
|                               | B - ▲  | Any                   | 2   |
| T2                            | D - K  | Any                   | 5   |
|                               | E - K  | Any                   | 11  |
|                               | G - ▲  | Any                   | 4500  |

VOLTAGE CHART

Voltages measured with respect to point ▲. Use a 20,000 ohms per volt meter. All values  $\pm 20\%$ .

| Point | Voltage | Voltmeter Range |
|-------|---------|-----------------|
| F     | 920     | *               |
| C     | 6.0     | 10              |
| H     | 3.2     | 10              |
| K     | 3.0     | 10              |

\*Use a high impedance voltmeter. See Appendix B.

Table 3-2. Test Point Chart

Black  
 Brown  
 Red  
 Orange  
 Yellow  
 Green  
 Blue  
 Violet

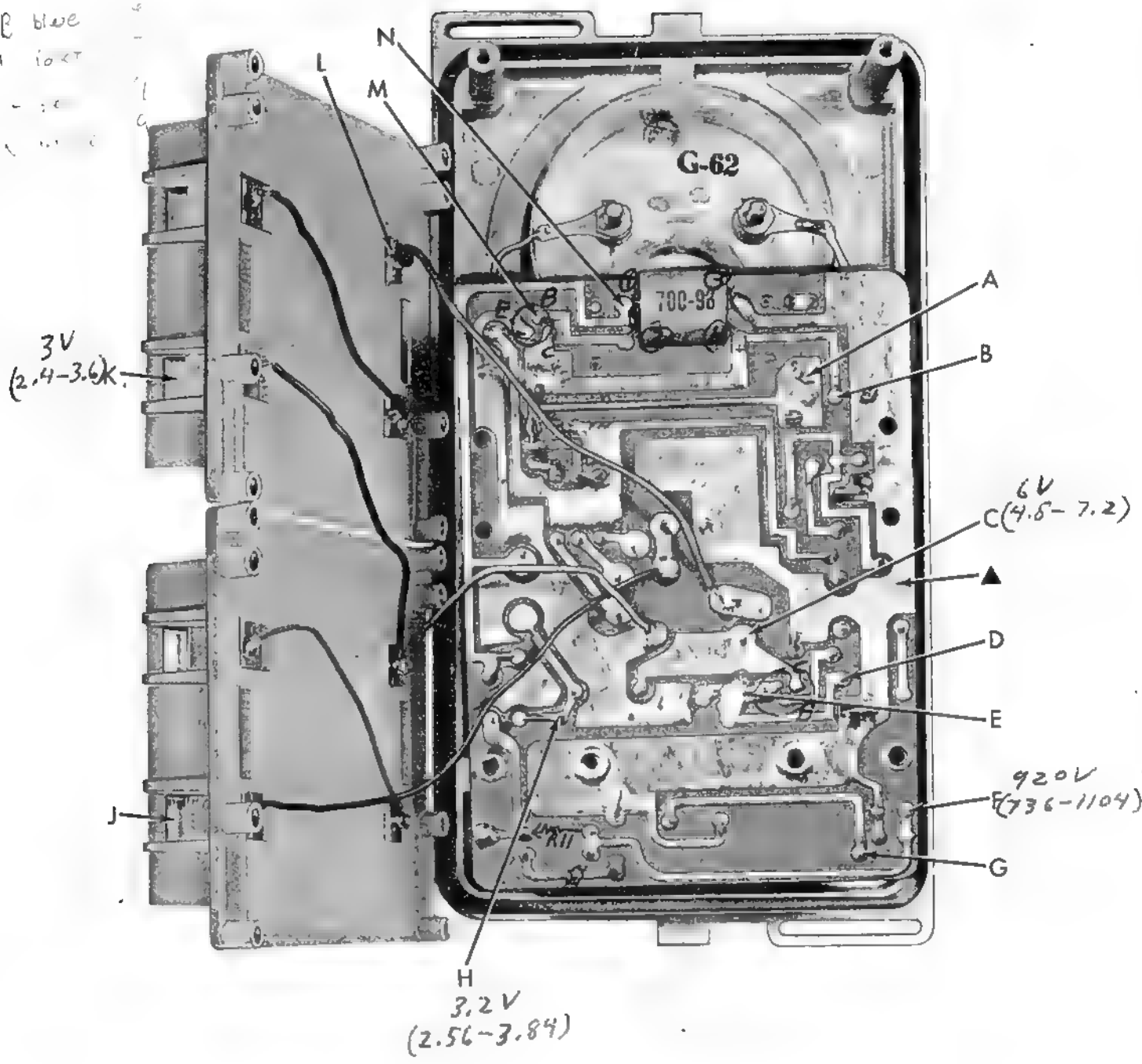
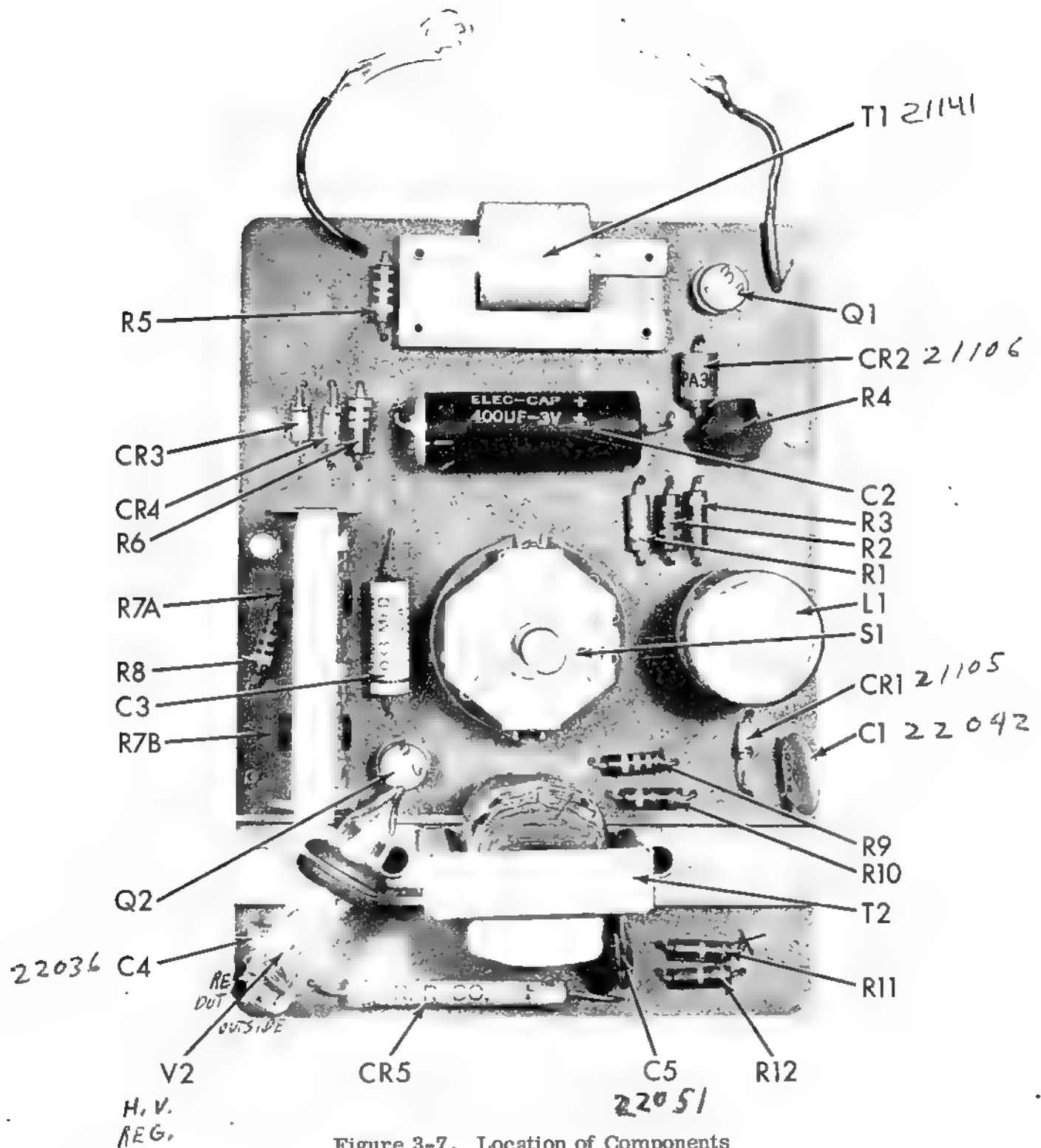


Figure 3-5. Location of Test Points



### Figure 3-6. Schematic Circuit Diagram





### Figure 3-7. Location of Components



# PARTS LIST

PG III-7 & III-43

## Electrical Components

| Circuit Symbol | Description                   | Function                  | Manufacturer & Part No.            | Victoreen Part No. |
|----------------|-------------------------------|---------------------------|------------------------------------|--------------------|
| BT1            | Battery 1.5V "D" size NEDA 13 | Power supply battery      | Union Carbide 950                  | 16-4               |
| BT2            | Battery 1.5V "D" size NEDA 13 | Power supply battery      | Union Carbide 950                  | 16-4               |
| BT3            | Battery 1.5V "D" size NEDA 13 | Ratemeter battery         | Union Carbide 950                  | 16-4               |
| BT4            | Battery 1.5V "D" size NEDA 13 | Ratemeter battery         | Union Carbide 950                  | 16-4               |
| C1             | Capacitor 0.0039 ufd 1000V    | Coupling capacitor        | Centralab DA 048 249 CB            | 21-193 22042       |
| C2             | Capacitor 400 ufd 3V          | Integrating capacitor     | Chemtronic Corp. 20-437BP 400-3D65 | 21-87 22077        |
| C3             | Capacitor 0.033 ufd 75V       | Headphone pulse stretcher | John E. Fast Co. 4-21365-3         | 21-194 22054       |
| C4             | Capacitor 0.001 ufd 1000V     | By-pass capacitor         | Radio Materials Corp. B.001 Discap | 21-43 22036        |
| C5             | Capacitor 0.01 ufd 1600V      | By-pass capacitor         | Good-All Electric Mfg. Co. H1-KB   | 21-23 22051        |

CD V-700-6 & 6A

Victoreen

| Circuit<br>Symbol | Description                  | Function                  | Manufacturer<br>& Part No.             | Victoreen |       |
|-------------------|------------------------------|---------------------------|--|-----------|-------|
|                   |                              |                           |  | Part No.  |       |
| CR1               | Diode, germanium             | Damper                    | CBS Electronics Sales Corp.<br>1N-34   | 52-1      | 21105 |
| CR2               | Diode, silicon               | Meter rectifier           | Radio Receptor Co. Inc.<br>PA-305A     | 52-35     | 21106 |
| CR3               | Diode, germanium             | Headphone pulse stretcher | CBS Electronics Sales Corp.<br>1N-34   | 52-1      | 21105 |
| CR4               | Diode, germanium             | Damper                    | CBS Electronics Sales Corp.<br>1N-34   | 52-1      | 21105 |
| CR5               | Rectifier, selenium          | High voltage rectifier    | International Rectifier Corp.<br>T35HP | 489-17    | 21132 |
| H                 | Headphone 4K ohms<br>at 1 kc | Aural indicator           | Suprex Electronics, Inc.               | 700-16    |       |
| J1                | Phone jack assembly          | Headphone connector       | Victoreen Instrument Co.<br>700-102    | 700-102   |       |
| L1                | Choke 8.2 mh                 | Geiger tube load          | J. W. Miller Co.<br>981                | 700-99    | 21101 |
| M1                | Meter assembly<br>0-50 ua    | Visual indicator          | Victoreen Instrument Co.<br>700-95     | 700-95    |       |
| Q1                | Transistor, PNP              | Ratemeter transistor      | Victoreen Instrument Co.<br>23-17      | 23-17     | 21143 |
| Q2                | Transistor, PNP              | Power supply transistor   | Victoreen Instrument Co.<br>23-6       | 23-6      | 21142 |

| Circuit<br>Symbol | Description                       | Function                       | Manufacturer<br>& Part No.            | Victoreen<br>Part No. |
|-------------------|-----------------------------------|--------------------------------|---------------------------------------|-----------------------|
| R1                | Resistor 1900 ohms<br>1/2W 5%     | X100 range multiplier          | Victoreen Instrument Co.<br>185-1412  | 185-1412              |
| R2                | Resistor 220 ohms<br>1/2W 5%      | X10 range multiplier           | International Resistance Co.<br>50-65 | 185-560               |
| R3                | Resistor 11 ohms<br>1/2W 5%       | 1/2 of X1 range multiplier     | International Resistance Co.<br>50-65 | 185-429               |
| R4                | Resistor 7 ohms<br>Wire wound 5%  | 1/2 of X1 range multiplier     | Victoreen Instrument Co.<br>185-1411  | 185-1411              |
| R5                | Resistor 2.7K ohms<br>1/2W 10%    | Meter time constant            | International Resistance Co.<br>50-65 | 185-252               |
| R6                | Resistor 4.7K ohms<br>1/2W 20%    | Part of calibration resistance | International Resistance Co.<br>50-65 | 185-1303              |
| R7                | Potentiometer 50K<br>ohms 5K ohms |                                | Stackpole Carbon Co.<br>DVV5K25K      | 22-6 21125            |
| R7A               | Section of R7<br>50K ohms         | Calibration control            | —                                     | — 21125               |
| R7B               | Section of R7<br>5K ohms          | Power supply adjust            | —                                     | —                     |
| R8                | Resistor 1.2K ohms<br>1/2W 10%    | Headphone decoupler            | International Resistance Co.<br>50-65 | 185-633               |
| R9                | Resistor 1.5K ohms<br>1/2W 10%    | 1/2 of Ratemeter Bias          | International Resistance Co.<br>50-65 | 185-351               |

CD V-700-6 &amp; 6A

Victoreen

| Circuit<br>Symbol | Description                         | Function                    | Manufacturer<br>& Part No.            | Victoreen<br>Part No. |
|-------------------|-------------------------------------|-----------------------------|---------------------------------------|-----------------------|
| R10               | Resistor 100 ohms<br>1/2W 10%       | 1/2 of ratemeter bias       | International Resistance Co.<br>50-65 | 185-118               |
| R11               | Resistor 1 meg<br>1/2W 20%          | Geiger tube load            | International Resistance Co.<br>50-65 | 185-1305              |
| R12               | Resistor 1 meg<br>1/2W 20%          | Filter                      | International Resistance Co.<br>50-65 | 185-1305              |
| S1                | Switch                              | Range switch                | Victoreen Instrument Co.<br>700-6     | 700-6                 |
| S1A               | Section of S1                       | Range multiplier selector   | —                                     | —                     |
| S1B               | Section of S1                       | Power supply battery switch | —                                     | —                     |
| S1C               | Section of S1                       | Ratemeter battery switch    | —                                     | —                     |
| T1                | Transformer assembly                | Pulse transformer           | Victoreen Instrument Co.<br>700-98    | 700-98                |
| T2                | Transformer                         | Power supply transformer    | Victoreen Instrument Co.<br>14-32     | 14-32                 |
| V1                | Geiger tube 6993                    | Detecting element           | Victoreen Instrument Co.<br>CPO 352   | CPO-352               |
| V2                | Voltage regulator<br>tube GV3A-900V | Regulates high voltage      | Victoreen Instrument Co.<br>CPO 240   | CPO-240               |

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| <u>Mechanical Components</u>      |   |  |                               |
|-----------------------------------|---|--|-------------------------------|
| <u>Description</u>                | <u>Function</u>                           | <u>Manufacturer<br/>&amp; Part No.</u>             | <u>Victoreen<br/>Part No.</u> |
| Battery compartment (2)           | Houses batteries                          | Victoreen Instrument Co.<br>700-66                 | 700-66                        |
| Battery contact (8)               | Electrical connections to<br>batteries    | Victoreen Instrument Co.<br>700-68                 | 700-68                        |
| Battery retainer clip (2)         | Holds batteries in battery<br>box         | Victoreen Instrument Co.<br>720-121                | 720-121                       |
| Cap plug and chain assembly       | Covers phone jack                         | Victoreen Instrument Co.<br>700-65                 | 700-65                        |
| Case bottom and clamp<br>assembly | Bottom case of instrument                 | Victoreen Instrument Co.<br>700-101                | 700-101                       |
| Case gasket                       | Water seal between case<br>top and bottom | Victoreen Instrument Co.<br>720-157                | 720-157                       |
| Case top                          | Top panel of instrument                   | Victoreen Instrument Co.<br>700-59                 | 700-59                        |
| Detent ball                       | Positions sliding probe<br>shield         | New Departure Div. GMC<br>1/16" ball<br>44055 Gr 2 | 700-89                        |
| Detent spring                     | Holds detent ball in place                | Victoreen Instrument Co.<br>700-85                 | 700-85                        |
| End cap                           | End cap of probe                          | Victoreen Instrument Co.<br>700-78                 | 700-78                        |

Victoreen

| Description            | Function                                 | Manufacturer<br>& Part No.          | Victoreen<br>Part No. |
|------------------------|--|-------------------------------------|-----------------------|
| Gasket                 | Seals probe                              | Victoreen Instrument Co.<br>700-79  | 700-79                |
| Grommet                | Holds voltage regulator<br>tube          | Philpott Rubber Co.<br>GB-225       | 373-75                |
| Instruction manual (2) | Operating instructions                   | Victoreen Instrument Co.<br>700-108 | 700-108               |
| Knob                   | Range switch knob                        | Harry Davies Molding Co.<br>1500K   | 710-85                |
| Meter gasket           | Water seal between case<br>top and meter | Victoreen Instrument Co.<br>700-63  | 700-63                |
| "O" ring               | Seals phone jack                         | Parker Appliance Co.<br>2-12        | 46-47                 |
| "O" ring               | Seals probe stand                        | Parker Appliance Co.<br>2-9         | 46-25                 |
| "O" ring               | Switch shaft water seal                  | Parker Appliance Co.<br>5427-1      | 46-38                 |
| Phone plug             | Headphone connection                     | Switchcraft<br>2501F                | 700-57                |
| Probe assembly         | Holds geiger tube                        | Victoreen Instrument Co.<br>700-75  | 700-75                |
| Probe clip             | Holds probe to case<br>handle            | Victoreen Instrument Co.<br>700-61  | 700-61                |



| Description                      | Function   | Manufacturer<br>& Part No.         | Victoreen<br>Part No. |
|----------------------------------|--|------------------------------------|-----------------------|
| Probe shield retaining<br>spring | Holds probe shield in place                      | Victoreen Instrument Co.<br>700-87 | 700-87                |
| Probe stand handle               | Instrument carrying handle;<br>holds probe clip  | Victoreen Instrument Co.<br>700-73 | 700-73                |
| Rubber gland                     | Seals probe cable                                | Victoreen Instrument Co.<br>700-71 | 700-71                |
| Seal nut                         | Clamps probe cable                               | Victoreen Instrument Co.<br>700-72 | 700-72                |
| Shoulder strap                   | Carrying strap                                   | Victoreen Instrument Co.<br>700-81 | 700-81                |
| Strap buckles (2)                | Carrying strap length<br>adjustment              | Waterbury Buckle Co.<br>807 5047   | 710-44                |
| Strap fasteners (2)              | Attaches shoulder strap<br>to instrument         | Victoreen Instrument Co.<br>700-82 | 700-82                |
| Transformer bracket              | Supports power supply<br>transformer             | Victoreen Instrument Co.<br>700-96 | 700-96                |
| Tube clip                        | Holds voltage regulator<br>tube to circuit board | Victoreen Instrument Co.<br>700-94 | 700-94                |

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Victoreen

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